CONTENTS

List of committees ix

Photograph of participants xi

Preface xiii

Welcome address xv

Opening address xvii

Plenary sessions

Clustering in stable and unstable nuclei in p-shell and sd-shell regions
Y. Kanada-En'yo, M. Kimura and H. Horiuchi 3

Helium clustering in Be isotopes
M. Freer and N.I. Ashwood, for the Charissa and DéMoN Collaborations 10

Exotic cluster structure in light neutron-rich nuclei
N. Itagaki, S. Aoyama, T. Otsuka, T. Yoshida, S. Okabe and K. Ikeda 17

Molecular resonance phenomena and alpha-clustering: recent progress and perspectives
C. Beck 24

A mean field view of some clustering phenomena in light and heavy nuclei
J.L. Egido and L.M. Robledo 31

Reaction cross-sections for carbon isotopes
A. Ozawa 38

Coulomb breakup of secondary beams of neutron-rich nuclei
LAND Collaboration, R. Palit, P. Adrich, T. Aumann, K. Boretzky, D. Cortina, U. Datta Pramanik, Th.W. Elze, H. Emling, M. Fallot, H. Geissel, M. Hellström, K.L. Jones, Le Hong Khiem, J.V. Kratz, R. Kulessa, A. Leistenschneider, G. Münzenberg, C. Nociforo, P. Reiter, H. Simon, K. Sümmerer and W. Walus 45

Tri-nucleon cluster structure in $A = 6$ nuclei above cluster decay threshold
H. Akimune, T. Yamagata, S. Nakayama, M. Fujiwara, K. Fushimi, K. Hara, K.Y. Hara, K. Ichihara, K. Kawase, Y. Matsui, K. Nakanishi, A. Shiokawa, M. Tanaka, H. Utsunomiya and M. Yosoi 52

News on ^{12}C from β-decay studies
ISOLDE Collaboration, H.O.U. Fynbo, C.Aa. Diget, Y. Prezado, J. Äystö, U.C. Bergmann, J. Cederkäll, P. Dendooven, L.M. Fraile, S. Franchoo, B.R. Fulton, W. Huang, J. Huikari, H. Jeppesen, A. Jokinen, B. Jonson, P. Jones, U. Köster, M. Meister, T. Nilsson, G. Nyman, M.J.G. Borge, K. Riisager, S. Rinta-Antila, I. Storgaard Vogelius, O. Tengblad, M. Turrion, Y. Wang, L. Weissman and K. Wilhelmsen 59

Nuclear forces and nuclear structure
V.R. Pandharipande 66

New mean field theory with the parity and charge mixing for the pion in nuclei
K. Ikeda, S. Sugimoto and H. Toki 73

Real-space and model-space descriptions of nuclei
Y. Akaishi 80

Chiral symmetry and finite pion mean field in nuclei
H. Toki, Y. Ogawa, S. Tamenaga, S. Sugimoto and K. Ikeda 87

Alpha-particle condensation in nuclei
P. Schuck, Y. Funaki, H. Horiuchi, G. Röpke, A. Tohsaki and T. Yamada 94

Two-proton radioactivity: the status and perspectives
M. Pfützner 101

Dynamics of cluster formation in liquid–gas phase transitions
M. Colonna, S. Ayik, V. Baran, Ph. Chomaz and M. Di Toro 108

Isospin diffusion in heavy ion collisions
B. Tsang and L. Shi 115

Recent experimental studies on particle-accompanied fission
M. Mutterer, Yu.N. Kopatch, P. Jesinger, A.M. Gagarski, F. Gönnenwein, J. von Kalben, S.G. Khlebnikov, I. Kojouharov, E. Lubkiewics, Z. Mezentseva, V. Nesvishevsky, G.A. Petrov, H. Schaffner, H. Scharma, D. Schwalm, P. Thirolf, W.H. Trzaska, G.P. Tyurin and H.-J. Wollersheim 122

Status of super heavy element research using GARIS at RIKEN
K. Morimoto, K. Morita, D. Kaji, S. Goto, H. Haba, E. Ideguchi, R. Kanungo, K. Katori, H. Koura, H. Kudo, T. Ohnishi, A. Ozawa, J.C. Peter, T. Suda, K. Sueki, I. Tanihata, F. Tokanai, H. Xu, A.V. Yeremin, A. Yoneda, A. Yoshida, T.-L. Zhao and T. Zheng 129

Photonuclear reaction studies at synchrotron radiation facilities in Japan
H. Utsunomiya, K.Y. Hara, S. Goko, H. Akimune, T. Yamagata, M. Ohta, H. Ohgaki, H. Toyokawa, T. Hayakawa, T. Shizuma, P. Mohr, Y.-W. Lui, H. Ohkuma, H. Yonehara, K. Soutome and M. Arnould 136

Nuclear structure and dynamics in the inner crust of neutron stars
P. Magierski and A. Bulgac 143

Microscopic cluster study of the $^{7}Be(p,\gamma)^{8}B$ and $^{17}F(p,\gamma)^{18}Ne$ reactions at astrophysical energies
P. Descouvemont and M. Dufour 150

Recent studies with fast RI beams of interest in nuclear structure and astrophysics
T. Motobayashi 155

Excited states in exotic nuclei populated by direct reactions of RI beams
S. Shimoura 162

High-density $\bar{K}$ clusters to be formed in relativistic heavy-ion collisions
T. Yamazaki, A. Doté and Y. Akaishi 168

Clustering aspects of light hypernuclei
E. Hiyama, M. Kamimura, T. Motoba, T. Yamada and Y. Yamamoto 175

Evidence for penta-quark states
T. Nakano 182

Clustering aspects and the shell model
A. Arima 188

Concluding remarks
D.M. Brink 195

Parallel sessions

Spectroscopic study of ^{11}Be through β-delayed neutron- and γ-decays of spin-polarized ^{11}Li
Y. Hirayama, T. Shimoda, H. Izumi, H. Yano, M. Yagi, A. Hatakeyama, C.D.P. Levy, K.P. Jackson and H. Miyatake 201

Asymmetry in the super-allowed β-transitions of the $A = 9$ isobars
M.J.G. Borge, Y. Prezado, U.C. Bergmann, R. Boutami, J. Cederkäll, C.Aa. Diget, L.M. Fraile, H.O.U. Fynbo, Y. Jading, H. Jeppesen, B. Jonson, I. Martel, M. Meister, T. Nilsson, G. Nyman, K. Riisager, H. Simon, O. Tengblad, L. Weissman, F. Wenander and K. Wilhelmsen 206

Measurement of nuclear moments in the region of light neutron-rich nuclei
H. Ueno, K. Asahi, H. Ogawa, D. Kameda, H. Miyoshi, A. Yoshimi, H. Watanabe, K. Shimada, W. Sato, K. Yoneda, N. Imai, Y. Kobayashi, M. Ishihara and W.-D. Schmidt-Ott 211

Cluster transformation coefficients in many-body nuclear physics
M. Tomaselli, L.C. Liu, S. Fritzsche, T. Kühl and D. Ursescu 216

Analysis of fusion–fission dynamics in superheavy mass region by pre-scission neutron multiplicities
Y. Aritomo, M. Ohta, T. Materna, F. Hanappe and L. Stuttge 221

Rotational bands with cluster structure for ^{24}Mg, ^{28}Si and ^{32}S
Y. Kondō and M. Katsuma 226

Airy structure in inelastic light heavy-ion scattering?
F. Michel and S. Ohkubo 231

$^{16}O + {}^{16}O$ molecular band and their relation to the superdeformed band of ^{32}S
M. Kimura and H. Horiuchi 236

Charge- and parity-projected Hartree–Fock study with the tensor force of light nuclei
S. Sugimoto, K. Ikeda and H. Toki 240

Search for highly-deformed or molecular states in a static Hartree–Fock method
J.A. Maruhn, M.R. Strayer, P.-G. Reinhardt and H. Horiuchi 245

Charm cluster in quark gluon plasma?
M. Asakawa and T. Hatsuda 249

Novel aspects of ${}^{5}_{\Lambda}He$ and tensor ΛN–ΣN coupling: a new view of ${}^{5}_{\Lambda}He$ beyond $\alpha + \Lambda$ model
H. Nemura and Y. Akaishi 254

Wide perspective of alpha condensation in light 4N nuclei
A. Tohsaki, H. Horiuchi, P. Schuck and G. Röpke 259

Chain states in ^{13}C and ^{14}C, nuclear polymers
W. von Oertzen 264

Study of the cluster state at $E_x = 10.3$ MeV in ^{12}C
M. Itoh, H. Akimune, M. Fujiwara, U. Garg, H. Hashimoto, T. Kawabata, K. Kawase, S. Kishi, T. Murakami, K. Nakanishi, Y. Nakatsugawa, B.K. Nayak, S. Okumura, H. Sakaguchi, H. Takeda, S. Terashima, M. Uchida, Y. Yasuda, M. Yosoi and J. Zenihiro 268

Atomic Bose–Fermi mixed condensates with boson–fermion quasi-bound cluster states
H. Yabu, Y. Takayama, T. Suzuki and P. Schuck 273

Dimensional dependency of Coulomb energy in an infinite aggregate with periodicity neutralized by a uniform background
H. Takemoto and A. Tohsaki 278

Coulomb and nuclear breakup of halo nuclei
T. Nakamura and N. Fukuda 283

Absorbing boundary condition approach to breakup reactions of one-neutron halo nuclei
M. Ueda, K. Yabana and T. Nakatsukasa 288

Two-proton halo in ^{17}Ne
R. Kanungo 293

Resonances and continuum states in the breakup of halo nuclei
T. Myo, S. Aoyama, K. Katō and K. Ikeda 298

Fusion reaction of halo nuclei: a time-dependent approach
K. Yabana, M. Ito, M. Kobayashi, M. Ueda and T. Nakatsukasa 303

Isospin fractionation and isoscaling in dynamical nuclear collisions
A. Ono, P. Danielewicz, W.A. Friedman, W.G. Lynch and M.B. Tsang 308

Cluster radioactivity and inverse processes
A.A. Ogloblin, S.P. Tretyakova, R.N. Sagaidak, S.A. Goncharov and G.A. Pik-Pichak 313

Unfavored alpha-decays of nuclei in cluster model
Z. Ren, C. Xu, Y. Wang and W.Q. Shen 318

Decay and structure of s-hole states in light nuclei
T. Yamada, M. Yosoi and H. Toyokawa 323

Highly excited light nuclei: alpha-cluster states, "low" level densities and shell-model quartets
T. Lönnroth 328

Structure of neutron-rich beryllium and carbon isotopes
H.G. Bohlen, R. Kalpakchieva, W. von Oertzen, T.N. Massey, B. Gebauer, T. Kokalova, A.A. Ogloblin, Ch. Schulz and S. Thummerer 333

Molecular states in neutron-rich beryllium isotopes
A. Saito, S. Shimoura, S. Takeuchi, T. Motobayashi, T. Minemura, Y.U. Matsuyama, H. Baba, H. Akiyoshi, Y. Ando, N. Aoi, Zs. Fülöp, T. Gomi, Y. Higurashi, M. Hirai, K. Ieki, N. Imai, N. Iwasa, H. Iwasaki, Y. Iwata, S. Kanno, H. Kobayashi, S. Kubono, M. Kunibu, M. Kurokawa, Z. Liu, S. Michimasa, T. Nakamura, S. Ozawa, H. Sakurai, M. Serata, E. Takeshita, T. Teranishi, K. Ue, K. Yamada, Y. Yanagisawa and M. Ishihara 337

Resonance structure of ^{9}Be and ^{10}Be in a microscopic cluster model
K. Arai 342

α-decaying excited states in carbon and boron isotopes
N. Soić, M. Freer, L. Donadille, N.M. Clarke, P.J. Leask, W.N. Catford, K.L. Jones, D. Mahboub, B.R. Fulton, B.J. Greenhalgh and D.L. Watson 347

$^{12}C + {}^{12}C \rightarrow {}^{8}Be_{g.s.} + {}^{16}O_{g.s.}$ resonance reactions and multi-cluster states of highly excited ^{24}Mg nucleus
M. Takashina, M. Ito, Y. Kudo, S. Okabe and Y. Sakuragi 352

Cluster structures within Fermionic Molecular Dynamics
T. Neff and H. Feldmeier 357

Systematic analyses on H- and He-isotopes by using an extended AMD approach
S. Aoyama and N. Itagaki 362

Three-body model for the complete fusion of a two-cluster composite projectile with a heavy target
M.S. Hussein, B.V. Carlson, T. Frederico and T. Tarutina 367

New types of clustering structure induced by K^- mesons
A. Doté, Y. Akaishi and T. Yamazaki 372

Mesic atoms and mesic nuclei
S. Hirenzaki 377

Faddeev calculation of the hypertriton in the quark-model NN and YN interactions
Y. Fujiwara, K. Miyagawa, M. Kohno and Y. Suzuki 382

Baryon superfluidity and neutrino emissivity of neutron stars
T. Takatsuka and R. Tamagaki 387

Strangeness production at ANKE/COSY
M. Nekipelov, for the ANKE Collaboration 392

Anti-d and anti-He production in Au + Au collisions at RHIC
J.S. Lange and C. Struck, on behalf of the STAR Collaboration 396

Exclusive measurement of the astrophysical $^{8}Li(\alpha, n)$ reaction cross section
H. Miyatake, H. Ishiyama, M.-H. Tanaka, Y.X. Watanabe, N. Yoshikawa, S.C. Jeong, Y. Matsuyama, Y. Fuchi, T. Nomura, T. Hashimoto, T. Ishikawa, K. Nakai, S.K. Das, P.K. Saha, T. Fukuda, K. Nishio, S. Mitsuoka, H. Ikezoe, S. Ichikawa, M. Matsuda, Y. Mizoi, T. Furukawa, H. Izumi, T. Shimoda and M. Terasawa 401

The astrophysical factor for the $^{11}B(p, \alpha_0)^{8}Be$ reaction extracted via the Trojan Horse method
S. Romano, C. Spitaleri, L. Lamia, A. Tumino, R.G. Pizzone, S. Cherubini, A. Del Zoppo, P. Figuera, M. Gulino, M. La Cognata, A. Musumarra, M.G. Pellegriti, A. Rinollo and S. Tudisco 406

Direct measurement of the astrophysical reaction $^{14}O(\alpha, p)^{17}F$
M. Notani, S. Kubono, T. Teranishi, Y. Yanagisawa, S. Michimasa, K. Ue, J.J. He, H. Iwasaki, H. Baba, M. Tamaki, T. Minemura, S. Shimoura, N. Hokoiwa, Y. Wakabayashi, T. Sasaki, T. Fukuchi, A. Odahara, Y. Gono, Zs. Fülöp, E.K. Lee, K.I. Hahn, J.Y. Moon, C.C. Yun, J.H. Lee, C.S. Lee and S. Kato 411

Deducing the asymptotic normalization constant of the 2^{+} subthreshold state in ^{16}O from $^{12}C + \alpha$ elastic scattering
J.-M. Sparenberg 416

Determination of S_{17} from ^{8}B Coulomb dissociation
K. Ogata, M. Yahiro, Y. Iseri, T. Matsumoto, N. Yamashita, T. Kamizato and M. Kamimura 421

Search for $t + t$ clustering in ^{6}He
L. Giot, P. Roussel-Chomaz, S. Pita, N. Alamanos, F. Auger, M.-D. Cortina-Gil, Ch.-E. Demonchy, J. Fernandez, C. Jouanne, A. Gillibert, V. Lapoux, L. Nalpas, E.C. Pollacco, A. Rodin, A. Pakou, K. Rusek, H. Savajols, J.-L. Sida, S. Stepantsov, G. Ter-Akopian and R. Wolski 426

Search for extremely neutron rich systems
R. Wolski, P. Roussel-Chomaz, S.I. Sidorchuk and G.M. Ter-Akopian 431

^{5}H and ^{5}He nuclear systems studied by means of the $^{6}He + {}^{2}H$ reaction
S.V. Stepantsov, M.S. Golovkov, A.S. Fomichev, A.M. Rodin, S.I. Sidorchuk, R.S. Slepnev, G.M. Ter-Akopian, M.L. Chelnokov, V.A. Gorshkov, Yu.Ts. Oganessian, R. Wolski, A.A. Korsheninnikov, E.Yu. Nikolskii and I. Tanihata 436

Breakup effects in $^{6}He + {}^{12}C$ elastic scattering
B. Abu-Ibrahim and Y. Suzuki 440

Selected posters

Molecular bands in ^{22}Ne
M. Dufour and P. Descouvemont 447

Cluster fragmentations of deep(1s)-hole states in light nuclei
M. Yosoi, H. Akimune, I. Daito, H. Ejiri, H. Fujimura, M. Fujiwara, K. Fushimi, K. Hara, K.Y. Hara, H. Hashimoto, T. Ishikawa, M. Itoh, Y. Itow, S. Kishi, T. Kawabata, K. Kawase, M. Kinoshita, K. Kobayashi, M. Nakamura, K. Nakanishi, Y. Nakatsugawa, S. Nakayama, T. Noro, E. Obayashi, S. Okumura, H. Sakaguchi, Y. Sakemi, M. Shiozawa, H. Takeda, T. Taki, A. Tamii, M. Tanaka, S. Terashima, H. Toyokawa, N. Tsukahara, M. Uchida, T. Yamada, T. Yamagata, Y. Yasuda, H.P. Yoshida, R.G.T. Zegers and J. Zenihiro 451

Three-alpha resonances in ^{12}C
C. Kurokawa and K. Katō 455

Analogies between nuclear clusters and fullerene cages
L. Qu, Y.L. Zhao, Z.L. Chen, X.F. Gao, Z.F. Chai, J. Zhang and G.M. Xing 459

Weakened nuclear opacity and binary reactions
Z. Basrak 463

Giant dipole resonances and the analogs of α-clusters in $A = 6$ and 7 nuclei
T. Yamagata, S. Nakayama, H. Akimune, M. Fujiwara, K. Fushimi, M.B. Greenfield, K. Hara, K.Y. Hara, K. Hashimoto, K. Ichihara, K. Kawase, M. Kinoshita, Y. Matsui, K. Nakanishi, M. Tanaka, H. Utsunomiya and M. Yosoi 467

Four-body CDCC analysis of $^{6}He + {}^{12}C$ scattering
T. Matsumoto, E. Hiyama, M. Yahiro, K. Ogata, Y. Iseri and M. Kamimura 471

Fusion and breakup in the reactions of $^{6,7}Li$ and ^{9}Be
K. Hagino, M. Dasgupta and D.J. Hinde 475

Collective clusterization effects in light heavy ion reactions
R.K. Gupta, M. Balasubramaniam, R. Kumar, D. Singh and C. Beck 479

Cell-size and generalized entropy determination in heavy-ion reactions
M. Dželalija, Z. Basrak and R. Čaplar 483

Study of extremely deep subbarrier $^{22}Ne + ^{208}Pb$ fusion–fission and evidence for alpha-decay-like mechanism of ^{230}U cluster radioactivity
S.P. Tretyakova, A.A. Ogloblin, R.N. Sagaidak, W. Trzaska, S.V. Khlebnikov, R. Julin and J. Perkowski 487

Shell effect in Pb isotopes near the proton drip line
C. Samanta and S. Adhikari 491

A consistent 3α and $2\alpha\Lambda$ Faddeev calculation using the 2α RGM kernel
Y. Fujiwara, K. Miyagawa, M. Kohno, Y. Suzuki, D. Baye and J.-M. Sparenberg 495

Cluster expression in fission and fusion in high-dimensional macroscopic–microscopic calculations
A. Iwamoto, T. Ichikawa, P. Möller and A.J. Sierk 499

Probing the ^{11}Li halo structure by two-neutron interferometry experiments
M. Petrascu, A. Constantinescu, I. Cruceru, M. Giurgiu, A. Isbasescu, H. Petrascu, C. Bordeanu, I. Tanihata, T. Kobayashi, K. Morimoto, K. Katori, A. Ozawa, T. Suda, K. Yoshida, S. Nishimura, M. Chiba and Y. Nishi 503

Breakup reaction studies of ^{10}Be and $^{10,11}B$ using a ^{10}Be beam
S. Ahmed and M. Freer 507

Experimental investigation of the $^{9}Li + d$ reaction at REX-ISOLDE
ISOLDE Collaboration, REX-ISOLDE Collaboration, H. Jeppesen, F. Ames, U.C. Bergmann, M.J.G. Borge, J. Cederkäll, S. Emhofer, L.M. Fraile, H.O.U. Fynbo, S. Henry, H.T. Johansson, B. Jonson, M. Meister, T. Nilsson, G. Nyman, M. Pantea, K. Riisager, A. Richter, K. Rudolph, G. Schrieder, T. Siebert, O. Tengblad, E. Tengborn, M. Turrión, R. von Hahn, F. Wenander and B. Wolf 511

A new mechanism of core collapsed supernova explosion—the important role of electron capture process
Q.-H. Peng 515

Study on the transient field at very high velocities for the g-factor measurement of excited states in unstable nuclei
A. Yoshimi, H. Ueno, W. Sato, H. Watanabe, Y. Kobayashi, J. Murata, H. Miyoshi, K. Shimada and K. Asahi 519

Program 523

List of participants 535

Author index 541

CONTENTS direct

This journal is part of **ContentsDirect**, the ***free*** alerting service which sends tables of contents by e-mail for Elsevier books and journals. You can register for **ContentsDirect** online at: **http://contentsdirect.elsevier.com**